

Toth et al.

S/N: 09/683,128

REMARKS

Claims 1-37 are pending in the present application. In the Office Action mailed November 22, 2004, the Examiner rejected claims 12, 16, 17, 32, 33, 35, and 36 under 35 U.S.C. §102(b) as being anticipated by Toth (USP 5,400,378). The Examiner next rejected claims 13, 19, and 37 under 35 U.S.C. §103(a) as being unpatentable over Toth '378 and further in view of Toth (USP 5,379,333). Claims 14 and 15 were rejected under 35 U.S.C. §103(a) as being unpatentable over Toth '378. Claims 18 and 34 were rejected under 35 U.S.C. §103(a) as being unpatentable over Toth '378 and further in view of Lavin et al. (USP 5,772,585).

Applicant appreciates the Examiner's indication that claims 1-11 are allowed.

Claims 12-37 stand rejected under 35 U.S.C. §112, first paragraph, on the basis that "the specification, while enabling for generating a current profile of an x-ray tube, does not reasonably provide enablement for generating a tube current profile." Office Action, 11/22/04, p.2. Accordingly, Applicant has amended claims 12-37 to further define the "tube current profile" as corresponding to a radiation emitting tube. Withdrawal of the rejections is requested.

The Examiner then rejected claims 12, 16, 17, 32, 33, 35 and 36 under 35 U.S.C. §102(b) as being anticipated by Toth. The reference discloses a dynamic dose control for a multi-slice CT system "in which tube current is modulated to reduce the x-ray dose without increasing image noise." Toth, USP 5,400,378, Abstract. While the claimed invention is also directed to tube current modulation to reduce radiation exposure to a subject without increasing image noise, the claimed invention, as defined by claim 12, in part, also allows "interactive adjustment of [a] generated tube current profile to convey a dose specific for each sub-volume in [an] VOI such that diagnostic quality is variable across the VOI." The cited reference makes no such teaching.

The cited reference discloses a system similar to that described in the Background of the Invention section of the present application. The reference describes a system and technique for determining a tube current profile to drive an x-ray tube based on scout

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scan data to reduce radiation dose to a subject. The reference, however, fails to teach or suggest interactive adjustment of the tube current profile after it has been determined.

Specifically, the reference discloses that patient projection data may be acquired and from that patient projection data, a relative attenuation function (RAF) can be calculated. Toth, supra. at col. 2, ll. 5-24. The RAF relates expected patient image quality to that of a reference object for each slice. Id. The RAF may then be used to modulate a tube current for each slice of a multi-slice scan. Id. The reference further teaches multiplying the RAF at each slice to a reference current at each slice to generate a tube current for each slice. Toth, supra. at col. 2, ll. 25-33. Toth also teaches that an operator may "reduce patient dose by specifying different image quality requirements over regions of the RAF." Toth, supra. at col. 2, ll. 37-39. The RAF, however, is not a tube current profile but only a component that is used to determine a tube current profile. As such, the reference neither teaches nor suggests user or operator adjustment of the tube current profile, as suggested by the Examiner.

That is, Applicant does not disagree that Toth states that it is desirable to have a dose reduction scheme that allows a user to pinpoint anatomical regions where lower radiation dose is acceptable. The process disclosed by Toth takes into account these user-input preferences when determining the tube current profile as the RAF is used to define the tube current profile. However, Toth does not teach user or interactive adjustment of the tube current profile after it has been determined. In fact, the system of Toth teaches away from post-determination adjustment of the tube current profile by indicating that an object of its invention is allow a user to identify specific anatomical regions where it is desired to have reduced radiation exposure. In this regard, the system of Toth takes into account user preferences when determining the tube current profile and, thus, suggests there is no need for subsequent user adjustment. The present application, however, detailed drawbacks of such a system and the "claimed" invention presents a unique solution to overcoming these drawbacks.

Accordingly, the art of record fails to teach or suggest that called for in claims 12, 16, 17, 32, 33, 35 and 36. Therefore, Applicant requests allowance of claims 12, 16, 17, 32, 33, 35 and 36 and those depending therefrom.

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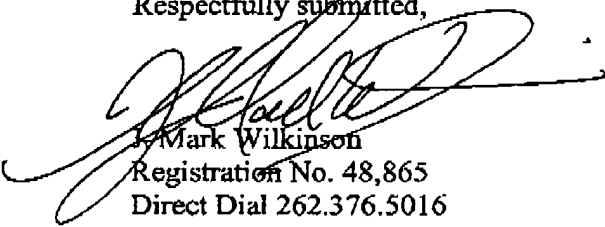
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The Examiner also rejected claims 13-15, 18-19, 34, and 37 under 35 U.S.C. §103. While Applicant disagrees with the Examiner with respect to the art as applied, in light of each of the aforementioned claims depending from what is believed an otherwise claim, Applicant does not believe additional remarks are necessary and requests allowance of claims 13-15, 18-19, 34, and 37 at least pursuant to the chain of dependency.

Therefore, in light of at least the foregoing, Applicant respectfully believes that the present application is in condition for allowance. As a result, Applicant respectfully requests timely issuance of a Notice of Allowance for claims 1-37.

Applicant appreciates the Examiner's consideration of these Amendments and Remarks and cordially invites the Examiner to call the undersigned, should the Examiner consider any matters unresolved.

Respectfully submitted,



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